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## CHAPTER A-14

### SUSTAINABLE DESIGN

#### 14.1 GENERAL.

14.1.1 Scope. This chapter states criteria, requirements and guidance for sustainable design. Specific submittal requirements in this chapter supplement the requirements of Volume 1. SPIRiT or LEED scoring is our internal measure of success for sustainable designs.

14.1.2 Objective. The objective of the Corps of Engineers (COE) is to incorporate sustainable design into all projects to the maximum extent feasible in coordination with functional, operational, cost and other project requirements. Follow ETL 1110-3-491 "Sustainable Design in Military Facilities" for design guidance for sustainable design.

14.1.2.1 Army Projects. SPIRiT, Appendix C to ETL 1110-3-491, is the Army's rating tool for measuring achievement in sustainable design. Unless indicated otherwise, all Army projects up to and including FY04 shall strive to achieve SPIRiT "Bronze" level as a minimum, all FY05 projects shall strive to achieve SPIRiT "Silver" level as a minimum, and all FY06 and beyond projects shall strive to achieve SPIRiT "Gold" level as a minimum.

14.1.2.2 Air Force Projects. LEED, by US Green Building Council ([www.usgbc.org](http://www.usgbc.org)) is the Air Force's rating tool for sustainable design. Air Force projects shall strive to achieve LEED ratings as indicated in predesign conference. LEED certification with USGBC is required only when indicated in predesign conference. Air Force sustainable development policy letter signed by ILE 19 Dec 01 (Copy available on SAS STD CD Disk2 or at <https://wwwmil.acc.af.mil/>) is in effect and applies to all MILCON (including non-privatized housing); consider for P-341 & privatized housing. The goal is to select 20% of FY04 projects as LEED pilot projects. Increasing a percentage of projects qualifying for LEED certification in subsequent years. 100% by FY09. For LEED certification 26 points (version 2.0) are required, but actual LEED certification is not required unless directed by ACC.

14.2 APPLICABLE PUBLICATIONS. The following publications form a part of this Manual to the extent indicated by the references thereto.

ETL 1110-3-491 Engineer Technical Letter, Sustainable Design in Military Facilities, 01 May 2001

TI 802-01 Technical Instructions for Code 3 Design with Parametric Estimate, 15 May 1998

TI 800-03 Technical Instructions – Technical Requirements for Design-Build, 1 July 1998

#### 14.3 PRECONCEPT SUBMITTAL REQUIREMENTS.

14.3.1 Submittal. Certain projects may be of such magnitude or significance that in order to select the best possible design the COE may require a study to be made prior to concept submittal. Where a preconcept submittal is specifically called for, the design team shall

submit three separate schemes of the project (Scheme A, Scheme B, Scheme C) consisting of a site plan, floor plan and major elevations for each scheme.

14.3.2 Sustainable Design Features. Each scheme shall include, for each occupied building type, a SPiRiT or LEED summary table identifying the SPiRiT/LEED points earned and those points which have good potential to be developed by the scheme. The summary table shall be formatted and have a numbering system that matches SPiRiT or LEED as applicable. See the table at exhibit A-14-1.

#### **14.4 CODE 3 DESIGN REQUIREMENTS.**

14.4.1 SPiRiT/LEED Summary Table. Submit a summary table for each occupied building type using a format similar to exhibit A-14-1 reflecting points already earned as reflected by the submittal and the points that will be earned in further design development and are reflected in the cost estimate.

14.4.2 Sustainable Design Narrative. For each point indicated on the Summary Table for each occupied building type provide a brief description of the feature(s) that constitute how the point is or will be earned. Briefly describe maintenance requirements associated with that feature as applicable. For features that were considered but not incorporated briefly describe the feature and the reason(s) for not pursuing them.

#### **14.5 CONCEPT/EARLY PRELIMINARY (35 PERCENT) DESIGN SUBMITTAL REQUIREMENTS.**

14.5.1 SPiRiT/LEED Summary Table. Submit a summary table for each occupied building type using a format similar to exhibit A-14-1 reflecting points already earned as reflected by the submittal and the points that you plan to earn in further design development.

14.5.2 Sustainable Design Narrative. For each point indicated on the Summary Table for each occupied building type provide a brief description of the feature(s) that constitute how the point is or will be earned. Briefly describe maintenance requirements associated with that feature as applicable. For features that were considered but not incorporated briefly describe the feature and the reason(s) for not pursuing them.

14.5.3 Supporting Documentation. For each point earned that requires production of a document, calculations to measure achievement of goals, or meetings: furnish the documents, calculations and minutes of meetings applicable to this level of design development.

#### **14.6 PRELIMINARY (60 PERCENT) SUBMITTAL REQUIREMENTS.**

14.6.1 Review Comments. Implement concept submittal review comments.

14.6.2 SPiRiT/LEED Summary Table. Submit updated summary table for each occupied building type reflecting points already earned as reflected by the submittal and the points that you plan to earn in further design development.

14.6.3 Sustainable Design Narrative. Provide updated sustainable design narrative for each occupied building type. Highlight any changes and describe the reason for the change. Provide references to the drawings and specifications for location of applicable features.

14.6.4 Supporting Documentation. For each point earned that requires production of a document, calculations to measure achievement of goals, or meetings: furnish the documents, calculations and minutes of meetings applicable to this level of design development. Calculations for Resource Reuse, Recycled Content, Local/Regional Materials, Rapidly Renewable Materials and Certified Wood points must be provided with the initial submittal of draft specifications.

#### **14.7 FINAL (100 PERCENT) DESIGN SUBMITTAL REQUIREMENTS.**

14.7.1 Review Comments. Implement Concept and Preliminary comments.

14.7.2 SPiRiT/LEED Summary Table. Provide updated summary table for each occupied building type.

14.7.3 Sustainable Design Narrative. Provide updated sustainable design narrative for each occupied building type. Highlight any changes and describe the reason for the change. Provide references to the drawings and specifications for location of applicable features. All sustainable design points claimed must be addressed in the drawings and/or specifications. If the project fails to meet it's sustainable design goals provide a detailed explanation of the reason(s) for the failure.

14.7.4 Supporting Documentation. For each point earned that requires production of a document, calculations to measure achievement of goals, or meetings: furnish the documents, calculations and minutes of meetings applicable to this level of design development. Include documents previously submitted so that this submittal contains all supporting documentation to support points earned to date.

#### **14.8 CORRECTED FINAL DESIGN SUBMITTAL REQUIREMENTS.**

14.8.1 Corrected Final Submittal. The corrected final submittal is not to be considered a normal design level and will be provided in those cases in which the review comments require revision due to A-E error or omission.

14.8.2 Review Comments. Implement final review submittal comments.

14.8.3 Verify consistency between plans, specifications and final SPIRiT/LEED score.

#### **14.9 REQUIREMENTS FOR PREPARATION OF DESIGN/BUILD RFP SOLICITATION PACKAGES.**

14.9.1 Draft RFP. Incorporate sustainable design goals and requirements into the draft RFP.

14.9.1.1 SPiRiT/LEED Summary Table. Include a Summary Table for each occupied building type using the format of exhibit A-14-1 as an appendix to the design requirements (edit as needed for SPIRiT or LEED). Fill in Summary Table to reflect points earned by the project independent of design and points that will be mandatory RFP requirements.

14.9.2 Final RFP. Incorporate draft RFP review comments.

## 14.10 TECHNICAL REQUIREMENTS.

14.10.1 Energy Economic Studies. Economic studies to evaluate the use of energy-related sustainable design features (building orientation, amount and location of windows, etc.) will be in accordance with Chapter A-7 ENERGY ANALYSIS.

14.10.2 Incorporation Into Contract Documents. All sustainable design features shall be incorporated into the drawings and specifications. Guide specifications must be edited to include requirements and to add construction submittals documenting compliance.

14.10.3 Calculations for Resource Reuse, Recycled Content, Local/Regional Materials, Rapidly Renewable Materials and Certified Wood. Calculations for Resource Reuse, Recycled Content, Local/Regional Materials, Rapidly Renewable Materials and Certified Wood points must be provided with the initial submittal of draft specifications. These calculations demonstrate the overall strategy for achieving the required goal, and will be cross-checked with individual specifications to ensure coordination.

## 14.11 OTHER RESOURCES.

<http://www.usgbc.org> - International Green Building Conference and Expo

<http://www.greenguide.com/> - The Green Building Resource Guide Book and CD

<http://www.greenspec.com/> - The Environmental Building news product directory and guide specification

[www.ebuild.com](http://www.ebuild.com) or <http://www.buildinggreen.com/> - Green Building Advisor and the E-Build Library CD

<http://www.wbdg.org/> - Whole Building Design Guide

## **CHAPTER A-14**

### **SUSTAINABLE DESIGN EXHIBITS**

- 14-A-1 SPIRIT Summary Table
- 14-~~B~~-1 LEED Green Building Rating System Version 2 Summary Table

APPENDIX XX  
SPIRIT SUMMARY TABLE

SPiRiT Summary Table					
PAR	FEATURE	Maximum points possible	Mandatory Points	Proposed/Earned Points	REMARKS
<b>NOTE: SEE SPIRIT TEXT FOR FULL DESCRIPTION OF REQUIREMENTS FOR EACH ITEM.</b>					
<b>COMPLIANCE IS REQUIRED IF "R" OR A NUMBER GREATER THAN ZERO APPEARS IN THE</b>					
<b>MANDATORY POINTS COLUMN</b>					
1.R1	Sediment/Erosion Control Plan	R	R	R	Project requirement
1.C1	Avoid undesirable sites	1			
	Site adjacencies/compatibility	1			
1.C2	Increase density	1			
	Minimize new infrastructure	1			
1.C3	Brownfield	1			
1.C4	Proximity to transit system	1			
	Bike racks & showers	1			
	Proximity to alternative fuel station	1			
	Parking capacity, carpool parking	1			
1.C5	Limited site disturbance , restoration	1			
	Reduced footprint	1			
1.C6	Stormwater runoff rate	1			
	Stormwater treatment	1			
1.C7	Reduce site heat islands	1			
	Reduce roof heat islands	1			
1.C8	Reduce light pollution	1			
1.C9	optimize site features	1			
1.C10	Cluster facilities	1			
	Mitigate offsite impacts	1			
1.C11	Site Ecology	1			
2.C1	High efficiacy irrigation/recycle site water	1			
	no irrigation	1			
2.C2	Innovative wastewater technologies	1			
2.C3	20% Water use reduction	1			
	30% Water use reduction	1			
3.R1	Building commissioning	R	R	R	Project requirement
3.R2	Minimum energy performance	R	R	R	Project requirement
3.R3	CFC Reduction	R	R	R	Project requirement
3.C1	Optimize energy performance	20			
3.C2	5% Onsite renewable energy	1			
	10% onsite renewable energy	2			
	15% onsite renewable energy	3			
	20% onsite renewable energy	4			
3.C3	Additional commissioning	1			
3.C5	Measurement and verification	1			
3.C6	Green power	1			
3.C7	Distributed generation	1			
4.R1	Storage & collection of recyclables	R	R	R	Project requirement
4.C1	Building reuse	3			
4.C2	Reduce construction waste	1			
	Reduce construction waste addl	1			



APPENDIX XX  
SPIRIT SUMMARY TABLE

4.C3	Salvage/reused materials	1			
	Salvage/reused materials addl	1			
4.C4	Materials recycled content	1			
	Addl materials recycled content	1			
4.C5	Regionally manufactured materials	1			
	Regionally extracted materials	1			
4.C6	Rapidly renewable materials	1			
4.C7	Certified wood	1			
5.R1	Minimum IAQ performance	R	R	R	Project requirement
5.R2	Environmental tobacco smoke	R	R	R	Project requirement
5.C1	IAQ monitoring	1			
5.C2	Increase ventilation effectiveness	1			
5.C3	SMACNA/absorptive mtl/filtration	1			
	Flushout/baseline IAQ test	1			
5.C4	Adhesive/sealant VOC	1			
	Green Seal paints & coatings	1			
	CRI Green Label carpet	1			
	No urea/formaldehyde resins	1			
5.C5	Indoor pollutant source control	1			
5.C6	Operable windows, perimeter light controls	1			
	Non-perimeter controls	1			
5.C7	ASHRAE thermal comfort stds	1			
	Temperature/humidity monitoring	1			
5.C8	75% daylighting	1			
	90% outdoor view	1			
5.C9	Noise control	1			
5.C10	IAQ management plan	1			
6.C1	Team leader experience	1			
	Train team	1			
	Identify project goals	1			
	Charettes	1			
	Resolve tradeoffs	2			
	Document results	1			
7.C1	Develop O&M plan	2			
	Durable materials	1			
7.C2	Quality indoor environment	1			
	Functional work environment	1			
	Healthy work environment	1			
8.C1	Determine functional life	1			
	Determine building life	1			
8.C2	Design for future uses	1			
	Minimize building size	1			
	TOTAL	100			

APPENDIX XX  
SPIRIT SUMMARY TABLE

LEED Summary Table - Green Building Rating System Version 2.0		Maximum points possible	Mandatory Points	Proposed/Earned Points	
PAR	FEATURE				REMARKS
1	<b>Sustainable Sites</b>				Project requirement
1.1	Credit 1: Site Selection	1			
1.2	Credit 2: Urban Redevelopment	1			
1.3	Credit 3: Brownfield Redevelopment	1			
1.4	Credit 4: Alternative Transportation	4			
1.5	Credit 5: Reduced Site Disturbance	2			
1.6	Credit 6: Stormwater Management	2			
1.7	Credit 7: Landscape and Exterior Design to reduce Heat Islands	2			
1.8	Credit 8: Light Pollution Reduction	1			
2	<b>Water Efficiency</b>				
2.1	Credit 1: Water Efficient Landscaping	2			
2.2	Credit 2: Innovative Wastewater Technologies	1			
2.3	Credit 3: Water Use Reduction	2			
3	<b>Energy and Atmosphere</b>				
	Prerequisite 1: Fundamental Building System Commissioning	R	R	R	Project requirement
	Prerequisite 2: Minimum Energy Performance	R	R	R	Project requirement
	Prerequisite 3: CFC Reduction in HVAC&R Equipment	R	R	R	Project requirement
3.1	Credit 1: Optimize Energy Performance	10			
3.2	Credit 2: Renewable Energy	3			
3.3	Credit 3: Additional Commissioning	1			
3.4	Credit 4: Elimination of HCFC's and Halons	1			
3.5	Credit 5: Measurement and Verification	1			
3.6	Credit 6: Green Power	1			
4	<b>Materials and Resources</b>				
	Prerequisite 1: Storage & Collection of Recyclables	R	R	R	Project requirement
4.1	Credit 1: Building Reuse	3			
4.2	Credit 2: Construction Waste Management	2			
4.3	Credit 3: Resource Reuse	2			
4.4	Credit 4: Recycled Content	2			
4.5	Credit 5: Local/Regional Materials	2			
4.6	Credit 6: Rapidly Renewable Materials	1			
4.7	Credit 7: Certified Wood	1			
5	<b>Indoor Environmental Quality</b>				
	Prerequisite 1: Minimum IAQ Performance	R	R	R	Project requirement
	Prerequisite 2: Environmental Tobacco Smoke (ETS) Control	R	R	R	Project requirement
5.1	Credit 1: Carbon Dioxide (CO2) Monitoring	1			
5.2	Credit 2: Increase Ventilation Effectiveness	1			
5.3	Credit 3: Construction IAQ Management Plan	2			
5.4	Credit 4: Low- Emitting Materials	4			
5.5	Credit 5: Indoor Chemical and Pollutant Source Control	1			
5.6	Credit 6: Controllability of Systems	2			
5.7	Credit 7: Thermal Comfort	2			
5.8	Credit 8: Daylight and Views	2			
	LEED Innovation Credits	4			
	LEED Accredited Professional	1			

Insert Project Name Here

Insert Installation Name Here

APPENDIX XX  
SPIRIT SUMMARY TABLE

	TOTAL	69			
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## SPiRiT (Version 1.4.1) Item 4.C4 RECYCLED CONTENT WORKSHEET

A	B	B-1	C	D	E	F
MATERIAL	QUANTITY (Optional)	UNIT COST (Optional)	TOTAL MATERIAL COST BxB1	POST-CONSUMER %	POST-INDUST %	RECYCLED VALUE (\$) Cx (D/20 + E/40)
Concrete w/fly ash				0	5	\$ -
Rebar						\$ -
Metal Stairs						\$ -
Misc Metals						\$ -
Struct Steel				25	0	\$ -
Lightgage Steel				25	0	\$ -
Metal Deck				25	0	\$ -
Metal Roofing						\$ -
Gypsum Sheathing						\$ -
Gypsum Wallboard						\$ -
Ceramic Tile						\$ -
Acoustic Tile						\$ -
Rubber wall base						\$ -
VCT						\$ -
Metal soffit/ceiling						\$ -
Carpet						\$ -
Paint						\$ -
Toilet Partitions						\$ -
Signage						\$ -
All Other Material						\$ -
		TOTAL	0		TOTAL	\$ -

$$\% \text{ Recycle content} = 100 \times [\text{F Total} / \text{C Total}]$$

$$\% \text{ Recycle content} = \# \text{DIV}/0!$$

Note: Replace default values for post-consumer % for structural steel, lightgage steel and metal deck if actual values are known.